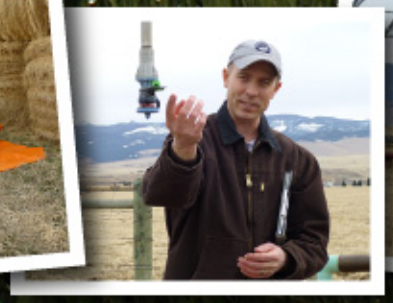
E3 in Montana Agriculture

E3.PeaksToPrairies.org



Peaks to Prairies Pollution Prevention Information Center

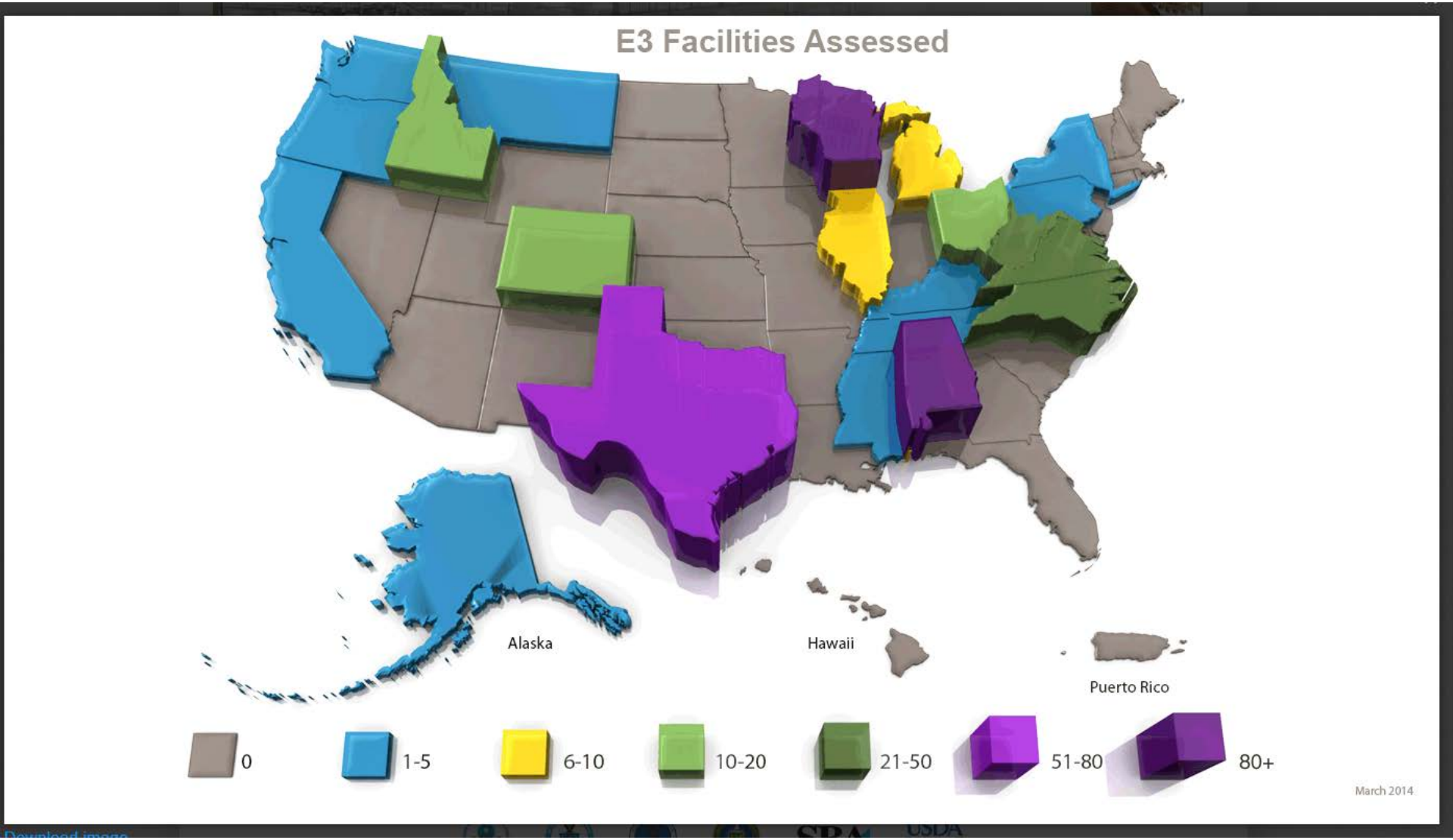
- Regional P2Rx center for EPA's Region 8 www.peakstoprairies.org
- Located at Montana State University in Bozeman
- Part of Housing and Environmental Health Dept in Extension
- Also coordinate the nationwide Tribal P2 workgroup www.tribalp2.org and Greening Local Government Initiative for Region 8 www.greenlocalgovernment.org

Tribal P2
Pollution Prevention Network
www.tribalp2.org

E3: ECONOMY • ENERGY • ENVIRONMENT

SUPPORTING MANUFACTURING LEADERSHIP THROUGH SUSTAINABILITY

U.S. Small Business Administration


E3 Facilities Assessed
Alaska
Hawaii
Puerto Rico
0
1-5
6-10
10-20
21-50
51-80
80+
March 2014

E3 in Montana Agriculture

- Initial discussions began in spring 2012
- Oct 2012 EPA Region 8 awarded Peaks to Prairies a Source Reduction Grant of $110,626
- Objective: Through hands-on E3 assessments we work with our agricultural community to reduce energy consumption, increase productivity, minimize carbon emissions, prevent pollution, & drive innovation.
- Fall 2012 filled with a series of phone and personal meetings to discuss partnership opportunities with potential stakeholders.
- Fall 2013 – Awarded a Region 8 Source Reduction Grant of $90,000 to expand pilot to statewide implementation (12-15 assessments).

E3 in Montana Agriculture GOAL

- Our goal is to ensure that by participating in E3, we have put our agricultural producers in the best position possible to maximize available financial opportunities in order to implement E3 recommendations.

What is the highest bar?

How do we make it happen…

1. Finding willing producers
2. Conducting assessments
3. Securing implementation dollars

USDA

FSA
FARM SERVICE AGENCY

USDA Rural Development
Committed to the future of rural communities

United States Department of Agriculture
NRCS Natural Resources Conservation Service

SBA
U.S. Small Business Administration

SBDC
Montana Small Business Development Center

NIST
National Institute of Standards and Technology
U.S. Department of Commerce

MEP • MANUFACTURING EXTENSION PARTNERSHIP
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

MONTANA STATE UNIVERSITY
EXTENSION

ACEEE
American Council for an Energy-Efficient Economy

CDFI FUND
CAPACITY BUILDING INITIATIVE

Montana Department of Environmental Quality

Partnerships

Cooperative Extension Service, USDA

Montana State University Extension – Professionals in each county of the state are in place to help Montana agricultural producers and land owners increase profits, reduce loss, protect our food supply and sustain future resources. They have an established trust relationship with producers and are essential in:

1. Finding producers willing to participate in an E3 assessment
2. Communicating the benefits of an E3 assessment and subsequent implementation of recommendations, and
3. Communicating successful outcomes to other producers in the state.

Natural Resource Conservation Services (NRCS) - NRCS conservationists work on agricultural land through field offices that serve every county in the state.

1. NRCS has developed numerous technical tools such as the Cropland Energy Estimator that will be important in calculating many of the E3 metrics.
2. NRCS also has funding sources such as the Environmental Quality Incentives Program (EQIP). This is our highest bar, so we must ensure our assessments are compliant with EQIP technical service provider requirements.

Rural Development (RD) – Montana (Region 8) is almost entirely a rural state and the mission of RD is to improve the quality of life for rural Montanans. The grants and loan opportunities that RD has available for agricultural producers include:

- Renewable Energy for America (REAP) program,
- Value added producer grants, and
- Loan guarantee programs.

Farm Services Agency (FSA) – FSA makes guarantee loans to family farmers and ranchers to promote, build, and sustain family farms in support of a thriving agricultural economy.

- Guaranteed Conservation Loan - provides a maximum loan amount of over a million dollars to implement any conservation practice in an NRCS approved conservation plan.

E3 in Montana Agriculture

E3.PeaksToPrairies.org

Myla Kelly, Coordinator Peaks to Prairies at Montana State University
myla.kelly@montana.edu 406-994-6948

Photo Courtesy of USDA NRCS

Diesel Efficiency – need overall efficiency through ALL systems

- Fuel
- Intake
- Exhaust
- Cooling
- Lubrication
- Electrical
- Wheels/Tires
- Ballasting
- Exhaust After Treatment

Photo Courtesy of USDA NRCS

Landscape Evaluations

Irrigation System Audit Report

Date of Audit: 06/10/04

Skinner Angus Ranch

System Information

Account Number(s): 589729
Meter Number: 56 554 474

Brief Description: Centrifugal pump, 1/2 circle pivot

Pumping Plant

Motor Nameplate Data

Make:	U.S. Electric Motors
Model or Serial No.:	AA95
Rated HP:	25
Rated Volts:	230/460
Rated Amps:	60/30
Frame:	284JPZ
Service Factor:	1.15
RPM:	1775
Rated Efficiency:	92.4%
No. Phases:	3

Pump Nameplate Data

Make:	Cornell	
Type:	Centrifugal	
Model:	4RB-25-4	
Serial No.:	116570	
Impeller Diameter:	10.5	Inches
Rated Flow:		GPM
Rated Head:		FT

Suction Side of Pump

Suction Pipe Internal Diameter:	0	in.
Pipe Material:	Steel	
Suction Lift/Pumping Water Level:	1.5	FT
OR Suction Head:	0	FT
Pipe & Fittings Friction Loss:	0.42	FT

Discharge Side of Pump

Discharge Pipe Internal Diameter:	7.794	inches
Pipe Material:	Steel	
Discharge Pressure:	40	psi
Water Source:	Ditch	
Pipe & Fittings Friction Loss:	0.33	FT

Results of Pumping Plant Efficiency Audit

Electrical Measurements

Electrical Power Input:	17.6	kW
Input Horsepower:	23.6	HP

Method Used: Power Measurement Method

Input horsepower is the power delivered to the motor. It is the power that you are actually billed for.

Flow and Head Measurements

Discharge Velocity:	4.4	FPS
Flow Rate:	647.0	GPM

Type of Flowmeter Used: Ultrasonic
Total Dynamic Head (TDH): 95.6 FT

Horsepower & Efficiency Calculations

Water Horsepower:	15.6	HP
Overall Pumping Plant Efficiency:	66.3%	

(Efficiency of Pump and Motor Together)

Overall pumping plant efficiency is the ratio of the output power into the water to the input power to the motor.

Brake Horsepower:	21.8	HP
Motor Efficiency:	92.4%	(est.)
Pump Efficiency:	71.8%	

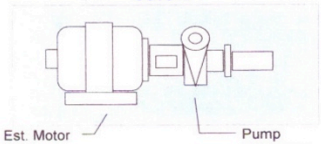
(Estimated efficiency of Pump alone)

Brake horsepower is the power actually delivered to the pump impeller. It's the horsepower value you see on pump curves.

Pumping Plant Efficiency

The Pumping Plant Efficiency of your 25 HP Centrifugal Pump= 66.3%

Your Overall Pumping Plant Efficiency
66.3%



This is compared to an achievable efficiency of 70%

Achievable Pumping Plant Efficiencies

Motor HP	Turbine Pumps	Centrifugal Pumps
0-25	67%	70%
25-75	69%	71%
75-150	70%	72%
150 +	71%	74%

Energy Consumption

Account Number(s): 589729
Meter Number: 56 554 474

25 HP Irrigation Pump
Acres Irrigated on this Account 90

Year: 2003 — kWh per Acre-Foot: 99.6 — Total Cost per Acre: $10.77

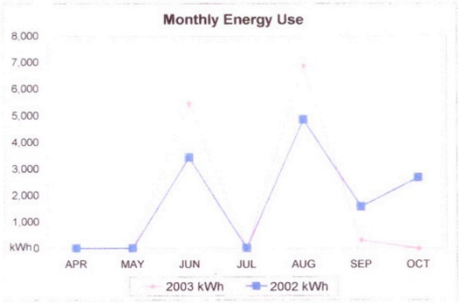
MON	KWH	KW	$KWH	$KW	TOT ELE $
APR					
MAY					
JUN	5,457	21	$184	$169	$352
JUL					
AUG	6,870	21	$299	$169	$467
SEP	303	17	$13	$137	$150
OCT					
TOT	12,630	59	$495	$474	$969

	Energy	Demand
% TOTAL ENERGY COSTS	51.1%	48.9%

Year: 2002 — kWh per Acre-Foot: 131.7 — Total Cost per Acre: $11.35

MON	KWH	KW	$KWH	$KW	TOT ELE $
APR					
MAY					
JUN	3,424	21	$90	$169	$258
JUL					
AUG	4,847	17	$163	$137	$300
SEP	1,569	17	$53	$137	$189
OCT	2,671	23	$90	$185	$275
TOT	12,511	78	$395	$626	$1,022

	Energy	Demand
% TOTAL ENERGY COSTS	38.7%	61.3%



Rate Schedule before 6/30/02

Demand Metered Irrigation Pumps

Energy	($/kWh)	$0.026228
Demand	($/kW)	$8.031622

Rate Schedule from 7/01/02 to 7/14/03

Demand Metered Irrigation Pumps

Energy	($/kWh)	$0.033627
Demand	($/kW)	$8.031622

Rate Schedule from 7/15/03 to 2004

Demand Metered Irrigation Pumps

Energy	($/kWh)	$0.043455
Demand	($/kW)	$8.031622

Rate Schedule for 2004

Demand Metered Irrigation Pumps

Energy	($/kWh)	$0.042802
Demand	($/kW)	$8.031622

Remarks:
2004 Irrigation rates are subject to monthly adjustments

USDA United States Department of Agriculture
Natural Resources Conservation Service

Energy Estimator: Irrigation Tool

User Input

State: **Montana**
Irrigation System: **Sprinkler**
Power Source: **Electric**
Well Lift: **3 (ft)**
System Pressure: **44 (PSI)**
Energy Cost: **$.105 /KWH**

System Modifications

No Flow Meter
Yes Irrigation Scheduling
Yes Maintenance & Upgrades

Crop: **Hay**
Acres irrigated: **135 (acres)**
Application: **10 (ac-in/ac)**

Seasonal Irrigation System

Description	Water Use Analysis		Energy Costs Analysis		Pumping Plant Evaluation Added	
	Current Water Use (ac-ft)	Reduction in Water Usage (ac-ft)	Energy Costs ($)	Energy Costs Savings ($)	Energy Costs ($)	Energy Costs Savings ($)
Your System Today	**113**		**$2,265**		**$1,925**	**$340**
Add Flow Meter to your system	106	7	$2,133	$132	$1,813	$452

Congratulations! By using Irrigation Scheduling and Maintenance and Upgrades you are saving $315 irrigating this crop with your system today.

The above results are estimates based on NRCS models to help you understand your irrigation water and pumping usage on your farm. For site specific irrigation water and pumping recommendations, contact your local land grant university. Please visit your local NRCS office for additional assistance.

Reported was generated on Thursday, April 18, 2013 11:49 AM, Mountain Time

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AN NRC
CROPLAND
ENERGY
ESTIMATION
TOOL

Directions: Step: 1 Fill in the orange and red shaded cells located in this "Input" tab. All required input cells are located in this tab and are separated into a Benchmark or currently operated and a Planned or potential operation through energy reduction measures of a

field. An explanation of each input variable is contained in the Definitions tab. Additional shaded cells will appear as additional crop names are selected from the "Crop Interval, Name, and Growth Dates" tables.

Step 2: Formatted energy balance summaries are located in the Report* tabs for printing.

BENCHMARK Start Date 5/15/2013 End Date 9/30/2020 Rotation Period (Yrs) 7.38

Landowner Information	
Landowner	Skinner Ranch
State	Montana
County	Granite
Date	11/26/2013
Latitude, [decimal degrees]	46.5972
Longitude, [decimal degrees]	113.2769

Background Information	**Benchmark**
Field Acres	260
Field ID	
Field Description	

Crop Interval, Name and Growth Dates

Crop Interval	Crop Name	Specific Crop Description	Year Crop Harvested [YYYY]	Biomass Yield ratio [-]	Labor [hr/acre]
1	Alfalfa brome	Alfalfa brome, fall seed senes to yr2 regrowth	2013	1.00	10.0
2	Triticale	Triticale, hay	2020	1.00	10.0
3					
4					
5					

Field Operations Diesel Use: Crop Interval 1 (Benchmark)				
Crop Name	Operation	Operation Description	Number of Times per Interval	Diesel Use [gal/ac]
Alfalfa brome	Tillage	Plow, moldboard	1	1.87
	Tillage	Disk, offset, heavy	2	1.8
	Tillage	Harrow, spike tooth	1	0.34
	Planting	Planter, double disk opnr	1	0.44
	Harvest	Mower, swather, on stubble 4in	2	0.7
	Harvest	Bale combine windrows	2	0.76
	Manual Input	Manually Input Operation Description and Diesel Use (if needed)	NA	
	Manual Input	Manually Input Operation Description and Diesel Use (if needed)	NA	
Field Operations Diesel Use: Crop Interval 2 (Benchmark)				
Triticale	Tillage	Plow, moldboard	1	1.87
	Tillage	Disk, offset, heavy	1	0.9
	Tillage	Harrow, spike tooth	1	0.34
	Planting	Planter, double disk opnr	1	0.44
	Harvest	Mower, swather, on stubble 4in	1	0.35
	Harvest	Bale combine windrows	1	0.38

Diesel Use [BTU/gal]

Home Page

Greenhouse Gas Table	GHG Emission Coefficients (EC) in lbs. per unit of energy input							
Energy Input	Units	Energy [MMBTU]	CO_2 [lb]	N_2O [lb]	CH_4 [lb]	Total CO_2 Equivalent [lb]	SO_2 [lb]	NO_x [lb]
Liquid								
Diesel	Gal	0.1400	22.3769	0.0005	0.003	22.586	0.0003	0.018
Gasoline	Gal	0.1260	19.6432	0.0006	0.003	19.888	0.0003	0.011
BioDiesel B2	Gal	0.1262	21.9139	0.0005	0.003	22.126	0.0001	0.010
BioDiesel B5	Gal	0.1262	21.2526	0.0005	0.003	21.461	0.0001	0.010
BioDiesel B10	Gal	0.1262	20.1282	0.0005	0.003	20.337	0.0001	0.010
BioDiesel B20	Gal	0.1273	17.9015	0.0005	0.003	18.110	0.0001	0.010
BioDiesel B100	Gal	0.1183	0.000	0.0005	0.003	0.209	0.0001	0.010
SVO	Gal	0.1231	0.000	0.0005	0.003	0.209	0.0001	0.010
Gas								
Propane	Gal	0.0916	12.6545	0.0004	0.002	12.821	0.0001	0.010
Natural Gas	CCF	0.1020	11.6977	0.0004	0.002	11.864	0.0001	0.010
CNG	CCF	0.1000	12.0372	0.00386	0.002	13.275	0.0001	0.010
Electricity								
Electricity	KWH	0.0034	0.8588	0.00001	0.00002	0.900	0.0013	0.0015
Other Energy Input								
Soil Admendments	Ton	11.25	0.000	0.0000	0.000	0.000	0.0000	0.000
Agrichemical	lb	Varies	0.000	0.0000	0.000	0.000	0.0000	0.000
Labor	Day	0.0119	0.000	0.0000	0.000	0.000	0.0000	0.000

Zip Code 59832

Headquarters Considerations

Farm Name: Skinner Ranch

Location	Lamp type**	wattage / length	Number of lamps/Fixtures	Days used per year	hour used per day
Yard lights	**Mercury Vapor**	**175**	**2**	**365**	**12**
Feed / Silo Room	**IN**	**100**	**2**	**365**	**2**
Milking Parlor - Pit	**T12 HO**	**8ft - 2 lamp**	**4**	**365**	**8**
Shop/Sale Barn	T-8 Tandem 2-bulb X 8ft	4-48" bulbs	21	365	1
Shop/Sale Barn	Metal Halide	320 W	6	365	1
Storage Area	T-8 Tandem 2-bulb X 8ft	4-48" bulbs	12	365	1
Storage Area	Metal Halide	320 W	3	365	1

** T12 - T12 Fluorescent (1-1/2" dia), T8 - T8 Fluorescent (1" dia), T5 - T5 Fluorescent (5/8" dia),
HO - High Output Fluorescent (example T12 HO)
CFL - Compact Fluorescent Lamp, MV - Mercury Vapor, MH - Metal Halide,
PSMH - Pulse Start Metal Halide, HPS - High Pressure Sodium, IN - Incandescent, H - Halogen

This is a list of the lamp types / wattages typically found in agricultural enterprises and included in the tool.

Lamp Type / Model / wattage

Incandescent - 25W
Incandescent - 34W
Incandescent - 40W
Incandescent - 52W
Incandescent - 60W
Incandescent - 65W
Incandescent - 75W
Incandescent - 90W
Incandescent - 100W
Incandescent - 120W
Incandescent - 150W
Incandescent - 200W
Incandescent - 300W
CFL - 11 W - "40" #
CFL - 13 W - "60" #
CFL - 15 W - "60" #
CFL - 18 W - "75" #
CFL - 20 W - "75" #
CFL - 23 W - "100" #
CFL - 25 W - "100" #
CFL - 30 W- "120" #
CFL - 40 W - "150" #
CFL - 42 W - "150" #
CFL - 55 W - "200" #
CFL - 60 W - "250" #
CFL - 80 W - "350" #
CFL - 100 W - "400" #
CFL - 150 W - "650" #
CFL - 200 W - "850" #
Halogen - 75 W
Halogen - 100 W
Halogen - 150 W
Halogen - 250 W
Halogen - 300 W
Halogen - 350 W
Halogen - 500 W
Halogen - 600 W
Halogen - 800 W
Halogen - 1000 W
Halogen - 1500 W
T-12 Fluorescent 1 bulb x 4ft
T-12 Fluorescent 2 bulb x 4ft
T-12 Fluorescent 1 bulb x 8ft
T-12 Fluorescent 2 bulb x 8ft
T-12 Tandem Fluorescent 1 bulb x 8ft (2- 48" bulbs)
T-12 Tandem Fluorescent 2 bulb x 8ft (4-48" bulbs)

Lamp Type / Model / wattage

T-12-HO Fluorescent 1 bulb x 4ft
T-12-HO Fluorescent 2 bulb x 4ft
T-12-HO Fluorescent 1 bulb x 8ft
T-12-HO Fluorescent 2 bulb x 8ft
T5 1-bulb x 45"
T5 2-bulb x 45"
T5 4-bulb x 45"
T5 6-bulb x 45"
T5-HO 1-bulb x 45"
T5-HO 2-bulb x 45"
T5-HO 4-bulb x 45"
T5-HO 6-bulb x 45"
T-9 Circular
T8-1 bulb x 4 ft
T8-2 bulb x 4 ft
T8-6 bulb x 4 ft
T8-1 bulb x 8 ft
T8-2 bulb x 8 ft
T8-Tandem 1 bulb x 8 ft (2-48" bulbs)
T8-Tandem 2-bulb x 8 ft (4-48" bulbs)
T8-HO 1 bulb x 8 ft
T8-HO 2 bulb x 8 ft
Mercury Vapor - 100 W
Mercury Vapor - 175 W
Mercury Vapor - 250 W
Mercury Vapor - 400 W
Mercury Vapor - 1000 W
Metal Halide - 100 W
Metal Halide - 150 W
Metal Halide - 175 W
Metal Halide - 250 W
Metal Halide - 320 W
Metal Halide - 350 W
Metal Halide - 400 W
Metal Halide Pulse Start - 100 W
Metal Halide Pulse Start - 150 W
Metal Halide Pulse Start - 175 W
Metal Halide Pulse Start - 250 W
Metal Halide Pulse Start - 320 W
Metal Halide Pulse Start - 350 W
Metal Halide Pulse Start - 400 W
Hi-Pres. Sodium - 70 W
Hi-Pres. Sodium - 100 W
Hi-Pres. Sodium - 150 W
Hi-Pres. Sodium - 200 W
Hi-Pres. Sodium - 250 W
Hi-Pres. Sodium - 400 W

W - watt of electricity
- "XX" - Value in quotes indicated the approximate equivalent wattage for an incandescent bulb with the same light output.

Rumsey Engineering

Headquarters Agriculture Energy Management Plan Project Summary

	Brief Farm Summary	Identified Projects	Estimated in AgEMP				Final Implemented Project					
			kWh Savings	Diesel Savings (gal)	Cost Savings	Project Cost	kWh Savings	Diesel Savings (gal)	Annual Cost Savings	Project Cost	NRCS Incentive	Utility Incentive
1	The farm operation consists of about 469 acres of irrigated farm ground with crop rotations of hay and small grains. There are four separate irrigation pump systems associated with this farm, the 75 hp Ditch Pump, the 40 hp Ditch Pump, the 50 hp Ditch Pump, and the Diesel Pump. There is also a farm shop located at the farm headquarters.	50 hp Ditch Pump Rebuild	6,788		$609	$3,000	6,316		$590	$650	None	$325
		Replace the 75 hp Ditch Pump	28,053		$2,486	$15,000	29,857		$2,757	$20,000	$19,580	$4,033
		Replace the Diesel Pump with an Electric Pump	(58,659)	2,400	$2,664	$85,000	(58,659)	2,400	$2,664	$42,000	$17,071	None
2	The farm operation consists of about 2,630 acres of irrigated farm ground with crop rotations of alfalfa, potatoes, and small grains. There are seventeen separate irrigation pump systems that supply water to different parts of the farm. There are also three potato storage units with fan ventilation systems.	Install VFDs on the Cellar #23 Fans	21,115		$1,856	$4,565	18,015		$1,673	$3,852	None	$1,409
		Rebuild the #2 Pump	22,725		$1,951	$10,000	Not implemented yet.					
		Replace the #1 Pump	25,462		$2,131	$12,000	Not implemented yet.					
		Replace the #3 Pump	9,289		$806	$6,000	Not implemented yet.					
		Rebuild the B2&4 Pump	26,658		$2,181	$18,000	Not implemented yet.					
		Replace the #6 pumps with a new pump with a VFD	21,680		$1,947	$28,000	18,471		$1,810	$30,675	$23,462	$2,567
		Install a VFD on the L5 Pump	16,003		$1,313	$22,000	11,038		$849	$26,675	None	$1,375
		Replace the B5 pumps with a new pump with a VFD	37,558		$1,881	$71,000	63,111		$3,368	$76,495	$44,040	$7,573
3	The farm operation consists of about 1,325 acres of irrigated farm ground with crop rotations of potatoes and small grains. The irrigation system consists of nine full circle center pivots with a design flow rate of 900 gpm, two part circle center pivots with a design flow rate of 550 gpm, and hand lines on some of the pivot corners. There are three irrigation pump stations that irrigate the entire farm, the Main Well and Booster, the West Well and Booster, and the Barn Well. There are also three potato storage units with fan ventilation systems, the A Frame Cellar, the Behlen Cellar, and the New Behlen Cellar.	Rebuild the Barn Pump	43,193		$2,815	$17,000	Not implemented yet.					
		Install a VFD on the Main Well & Booster Pumps	117,846		$5,903	$105,000	Final project inspection hasn't been completed. The utility incentive is an estimate based on expected savings.				$80,592	$14,142
4	The farm operation consists of about 276 acres of irrigated farm ground with crop rotations of potatoes and small grains. Typically, 25% of the farm is planted in potatoes and 75% is planted in grain. There is one irrigation pump system on this farm.	Install a VFD on the Irrigation Pump	26,487		$1,327	$43,000	Project is currently being installed. The utility incentive is an estimate based on expected savings.				$30,222	$3,178
5	The farm operation consists of about 1,017 acres of irrigated farm ground with crop rotations of potatoes and small grains. There are three separate irrigation pump systems associated with this farm, the 400 hp Well Pump, the 50 hp Ditch Pump, and the 500 hp Well Pump. There is also a potato storage unit with a fan ventilation system.	Install a VFD on the 50 hp Ditch Pump	9,581		$630	$9,800	Not implemented yet.					
		Install a VFD on the 400 hp Well Pump	32,883		$1,647	$50,000	Project is currently being installed. The utility incentive is an estimate based on expected savings.				$40,286	$3,946

Note:
This table was prepared to summarize the impact of completing an Agriculture Energy Management Plan, Headquarters for five separate farms.
The table shows the energy saving opportunities that were identified and the estimated energy savings, cost savings, and project cost for the identified projects.
The table also shows the final project energy savings, cost savings, project cost, and USDA and/or utility incentives paid toward the project for those projects that were implemented.

2. Summary of Recommendations

Table 1 below includes a summary of the recommended energy saving measures for this farm. Only those measures with a simple project payback of 10 years or less are included in the table. The summary for those measures with a project payback greater than 10 years is included in the text of this report in Section 3 if applicable.

Table 1. Summary of Estimated Annual Energy Efficiency Improvements

	Estimated Reduction in Energy Use			Estimated Costs, Savings, Payback, and Prioritization for Implementation			Environmental Benefits				
							Greenhouse Gases			Air Pollutant Co-Benefits	
Recommended Measure	Electric Savings (kWh)	Diesel Savings (Gal.)	Energy Savings (mBTU)	Installed Cost [a]	Energy Cost Savings [b]	Payback in Years [a/b]	Est. CO2 (lbs)	Est. N2O (lbs)	Est. CH4 (lbs)	Est. SO2 (lbs)	Est. NOx (lbs)
Upgrade the Lighting in the Shop and Grain Facility	5,217		17.81	$1,100	$626	1.8	4,480.31	0.07	0.09	6.71	7.57
Totals	**5,217**		**17.81**	**$1,100**	**$626**	**1.8**	**4,480.31**	**0.07**	**0.09**	**6.71**	**7.57**

Table 2. Energy Savings of Recommendations

Fuel	Current Usage	mBtu Usage	Savings	mBtu Savings	% Savings
Electricity (kWh)	9,272	31.65	5,217	17.81	56.3%
Totals		31.65		17.81	56.3%

BIOBASED PRODUCTS

Defined by the 2002 Farm Bill, biobased products are commercial or industrial products (other than food or feed) that are composed in whole, or in significant part, of biological products, renewable agricultural materials (including plant, animal, and marine materials), or forestry materials. The 2008 Farm Bill extended the definition of biobased products to include biobased intermediate ingredients or feedstocks.

BENEFITS OF USING BIOBASED PRODUCTS

The purchasing of biobased products helps many of the farmers across America who grow corn, soybeans, and other resources used by companies in the biobased industry. Another key benefit of biobased products is that they are not petroleum-based. This helps alleviate the consumption of resources that harm the environment in terms of biodegrability, toxicity, and pollution.

USDA has established minimum biobased content standards for many product categories. A product or package must meet or exceed the minimum biobased content percentage in its given category in order to use the Certified Biobased Product label. Where US Department of Agriculture (USDA) has not established minimum biobased content standards for a product category, companies may apply for the Certified Biobased Product label if the product or package contains a minimum of 25% biobased content.

BIOPREFERRED PROGRAM

The BioPreferred program is a Federal initiative designed to increase the development, purchase, and use of biobased products made from agricultural, forestry, or marine materials. The BioPreferred program aims to increase the purchase and use of renewable, environmentally friendly biobased products, while spurring job creation through expanding new markets for farmers, manufacturers, and vendors.

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Fact Sheet: Small Spill Response Procedures

Federal regulations require owners or operators of non-transportation-related bulk petroleum storage facilities, having an aggregate aboveground storage capacity greater than 1,320 gallons or a buried storage capacity greater than 42,000 gallons, to prepare and maintain a site-specific Spill Prevention, Control and Countermeasures (SPCC) Plan for their facility. The SPCC Plan will include procedures for managing spills. Farmers that have spills that are small or that are not addressed in a formal SPCC Plan should manage those materials to prevent pollution to their property and the general environment. Common practices to respond to these situations include:

Step 1: Stop the spill.
The leak or spill should be stopped by properly qualified and equipped personnel — if this can be done safely. Turn off nozzles or valves from the leaking container, if it can be done safely. Use a wooden plug, bolt, band or putty on a puncture-type hole.

Step 2: Contain and recover the spill.
If the spill or leak cannot be stopped, catch the flowing liquid using a pan, pail, hubcap, shovel or whatever is available. Spreading sorbent material, such as kitty litter, sand, ground corncobs, straw, sawdust, wood chips, peat, synthetic sorbent pads, or dirt from the roadside can stop the flow and soak up the petroleum on pavement. Sorbents do not make petroleum nonflammable.

Step 3: Collect the contaminated sorbent.
Brooms can be used to sweep up the sorbent material and put it into buckets, garbage cans or barrels or on top of plastic sheeting. Remember to control ignition sources.

Step 4: Secure the waste.
Disposal of the contaminated sorbent is the owner or operator's responsibility. Disposal options vary depending on the material and quantity. The local health department, fire department, waste hauler of Montana Department of Environmental Quality (DEQ) should be contacted to determine the proper management options. A good online resource is the DEQ "Cleanup Report Guidance Document for Spills or Releases that Impact Soils" that can be found at http://deq.mt.gov/enf/spillcleanupguidance.mcpx .

The following types of spills should be reported to DEQ:

- Spills that enter or may enter state water or a drainage that leads directly to surface water;
- Spills that cause sludge or emulsion beneath the surface of the water, streambanks or shorelines;
- Spills that cause a film, "sheen," or change the color of the water, streambanks or shorelines; or
- Spills of twenty-five (25) gallons or more of any petroleum product such as: crude oil, gasoline, diesel fuel, aviation fuel, asphalt, road oil, kerosene, fuel oil; produced water, injection water, or combination thereof; and derivatives of mineral, animal, or vegetable oils.

Releases and spills should be reported immediately to the state's Disaster and Emergency Services (DES) 24-hour phone number (406) 324-4777. If no one can be reached at that number, the release or spill may be reported to the Montana Department of Environmental Quality (DEQ) duty officer at (406) 431-0014.

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Next Steps – Matching project recommendations with funding mechanisms

- USDA
  - Farm Services of America
  - Rural Development
    - REAP
    - Renewable Energy and Energy Efficiency Loan Guarantees
    - Value- Added Producer Grants
  - Natural Resources Conservation Service
    - EQIP
- Department of Commerce
- Department of Energy
- Small Business Administration
- Department of Labor
- Environmental Protection Agency
- Sustainable Agriculture and Food Systems Funders http://www.safsf.org/

Next Steps

- Identify a good fit
- Sit down/communicate with local offices to get an indication of whether you're on the right track
- For projects that don't cleanly fit within a program, what are other creative funding mechanisms?

Funding Opportunities for Energy Efficiency Projects in Agriculture Production

Using E3 (Economy, Energy and Environment) to identify and fund energy efficiency and environmental projects for agricultural producers

E3: Economy Energy Environment

MONTANA STATE UNIVERSITY EXTENSION

Peaks to Prairies

Funded in part by grants from US EPA's Office of Chemical Safety and Pollution Prevention

Farm Services of America

Guaranteed Conservation Loans

Program Description: Conservation loan funds are used to implement any conservation practice in an NRCS approved conservation plan, as well as being used to refinance debts related to implementing an NRCS approved conservation plan. The rate on these loans is determined by the lender for a term not to exceed 30 years and there is a loan guarantee fee of 1.5%.

Example projects include: Funds can be used to implement a conservation practice approved by the Natural Resources and Conservation Service, such as to reducing soil erosion, improving water quality, and promoting sustainable and organic agricultural practices.

Who is eligible: Eligibility requirements include being a citizen of the United States, a non-citizen national, or a qualified alien, as well as possessing the legal capacity to obtain a loan. The operation must be a family farm or ranch, and the majority of the physical labor and management is provided by you, a family member, or another entity member, as well as not having any debt to the U.S. Government.

Funding Amount: $1,355,000 (amount adjusted annually for inflation)

How/when to apply: applicant information available on www.fsa.usda.gov

Link: http://www.fsa.usda.gov

Farm Services of America

Direct Operating Loans

Program Description: Operating loans will help you purchase livestock, poultry, equipment, feed, seed, farm chemicals and supplies, and pay for minor real estate repairs and annual operating expenses. It will also assist with soil and water conservation, or to refinance debts with certain limitations.

Example projects include:

Who is eligible: Eligibility requirements include being a citizen of the United States, a non-citizen national, or a qualified alien, as well as possessing the legal capacity to obtain a loan. You must be able to prove that you cannot obtain credit elsewhere at reasonable rates and terms, and have good credit history. Your operation must be a family farm or ranch, with the majority of the physical labor and management being provided by you, a family member, or another entity member. The loanee cannot have experienced debt forgiveness or be behind in any debt to the U.S. Government when the loan is closed.

Funding Amount: $300,000

How/when to apply:

Link: http://www.fsa.usda.gov

USDA
United States Department of Agriculture

Program sustainability

- Building this knowledge & awareness of implementation opportunities/ funding mechanisms is another large area of capacity building, training potential that we are developing but need partner support.
- Increasing the number of Extension Agents trained in all aspects of the process

e3.peakstoprairies.org

E3 IN MONTANA AGRICULTURE

E3: Economy, Energy, and Environment is a coordinated federal and local technical assistance framework that helps communities adapt and thrive in a new business era focused on sustainability by providing customized, hands-on assessments of production processes.

Montana is leading the nation by using this framework with our agricultural producers to reduce energy consumption, increase productivity, minimize their carbon footprint, prevent pollution, and drive innovation.

Identifying and Delivering Energy Savings for our Agricultural Producers

We are currently seeking agricultural producers for E3 Assessments in 2014!

What is involved:

- Producers cooperate with their trained, local Extension Agent to collect on-farm information for: past and current energy usage, irrigation efficiency, diesel maintenance, lighting, harvest and planting regimes, production practices, etc
- Data is collected through pre-assessment interviews and an on-site audit
- Agents compile an E3 Assessment Report with a series of energy efficiency recommendations
- If the producers have an interest, agents will work to align recommendations with potential funding opportunities

How producers benefit:

✓ Identification and calculation of energy saving opportunities

✓ Assessment results are suitable for submission to multiple federal and state funding programs including USDA NRCS, RD & FSA; MT DEQ; and SBA

Peaks to Prairies

E3: Economy Energy Environment
www.e3.gov

MONTANA STATE UNIVERSITY EXTENSION

To get involved and for more information:
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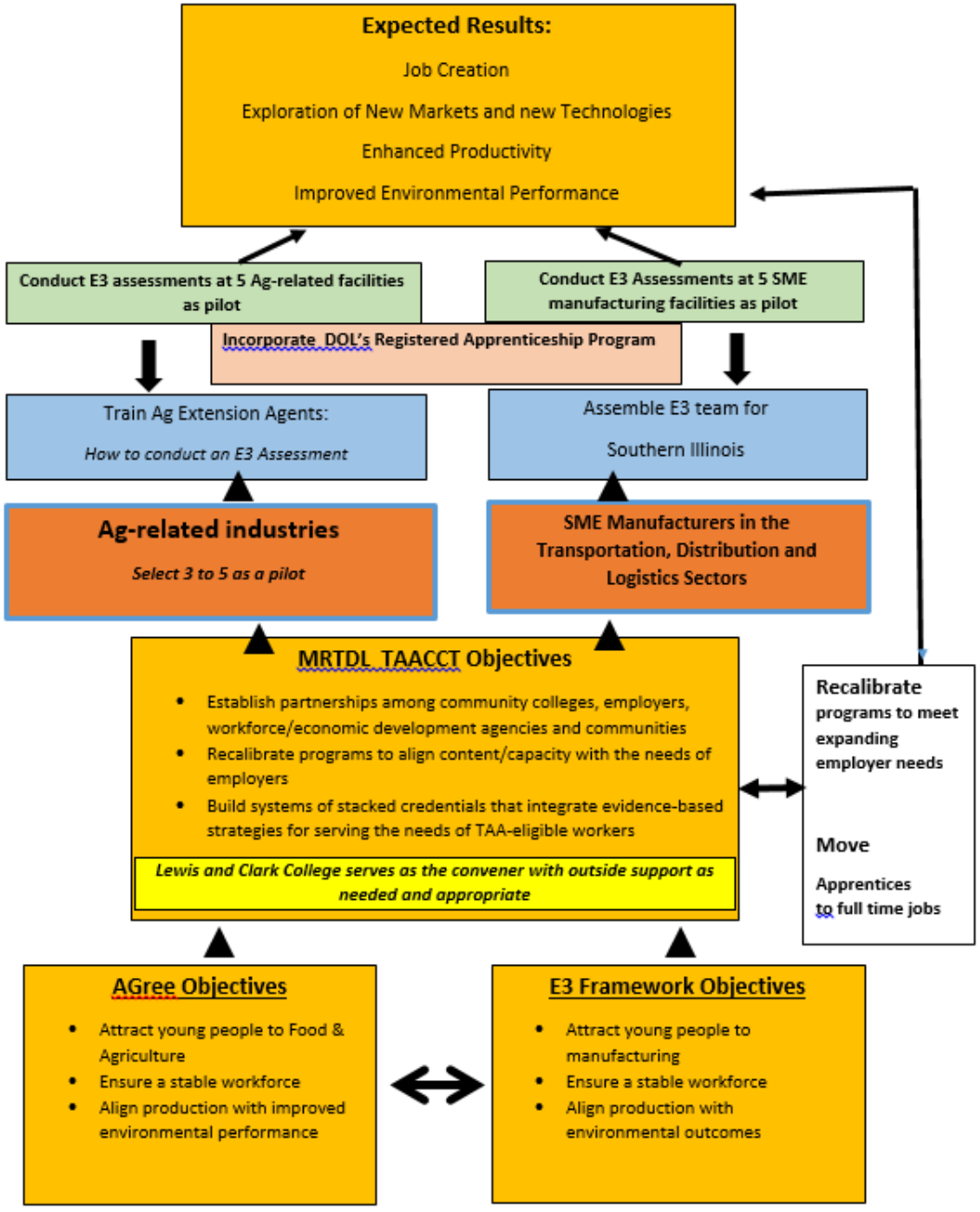
Expected Results:
Job Creation
Exploration of New Markets and new Technologies
Enhanced Productivity
Improved Environmental Performance
Conduct E3 assessments at 5 Ag-related facilities as pilot
Conduct E3 Assessments at 5 SME manufacturing facilities as pilot
Incorporate DOL's Registered Apprenticeship Program
Train Ag Extension Agents:
How to conduct an E3 Assessment
Assemble E3 team for
Southern Illinois
Ag-related industries
Select 3 to 5 as a pilot
SME Manufacturers in the Transportation, Distribution and Logistics Sectors
MRTDL TAACCT Objectives
Establish partnerships among community colleges, employers, workforce/economic development agencies and communities
Recalibrate programs to align content/capacity with the needs of employers
Build systems of stacked credentials that integrate evidence-based strategies for serving the needs of TAA-eligible workers
Lewis and Clark College serves as the convener with outside support as needed and appropriate
Recalibrate programs to meet expanding employer needs
Move
Apprentices to full time jobs
AGree Objectives
Attract young people to Food & Agriculture
Ensure a stable workforce
Align production with improved environmental performance
E3 Framework Objectives
Attract young people to manufacturing
Ensure a stable workforce
Align production with environmental outcomes

E3 in Montana Agriculture

E3.PeaksToPrairies.org